Database Security

Duration: 2hrs

View Definition and Use

SQL and User Views

Creating a View

CREATE VIEW *view-name*

(*column-name,)*

AS *query*

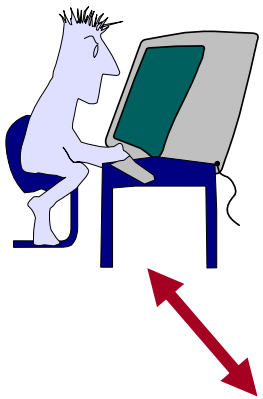
SQL User Views

- Column names specified must have the same number of columns derived from the query
- Data definitions for each column are derived from the source table
- Columns will assumed corresponding column names in the source table. Names must be specified for calculated or identical columns.

Mechanics of Views

- A view's definition is represented by storing in the data dictionary the text of query that defines the view

```
CREATE VIEW Emp_View AS
SELECT  Emp_No, Emp_Name, Age, Dept_Name
FROM    Employee, Department
WHERE   Emp.Dept = Dept.Dept_Code
        and Dept.Dept_Code = 'SAL';
```



External Layer

Emp_View

Emp_No	Emp_Name	Age	Dept
179	Silva	27	Sales
342	Dias	26	Sales

View Tables

Base Tables

Department ◄···► Employee

Dept_Code	Dep_Name	Manager
SAL	Sales	179
FIN	Finance	857

Emp_No	Emp_Name	Designation	DOB	Dept
179	Silva	Manager	12-05-74	SAL
857	Perera	Accountant	01-04-67	FIN
342	Dias	Programmer	25-09-74	SAL

User View Access

SELECT * FROM **Emp_View**
WHERE **Designation='Programmer'**

Emp_View

Emp_No	Emp_Name	Designation	DOB	Dept
179	Silva	Manager	12-05-74	SAL
342	Dias	Programmer	25-09-74	SAL

Types of User views

Selection (Horizontal or Row)

```
CREATE VIEW Sales_Employees AS
SELECT  *
FROM    Employee
WHERE   Dept = 'SAL'
```

Types of User views

Projection (Vertical or Column)

```
CREATE VIEW Emp_Info AS
SELECT  Emp_No, Emp_Name, Designation
FROM    Employee
```

Types of User views

Row/Column

```
CREATE VIEW Sales_Emp_Info AS
SELECT  Emp_No, Emp_Name, Designation
FROM    Employee
WHERE   Dept = 'SAL'
```

Types of User views

Summarised

```
CREATE VIEW Dept_Employees
            (Dept_Code, No_Employees) AS
SELECT      Dept, COUNT(*)
FROM        Employee
GROUP BY    Dept
```

Types of User views

Derive

```
CREATE VIEW Emp_Age_View AS
SELECT      *, YEAR(CURRENT)-
                YEAR(DOB) AS Age
FROM        Employee
GROUP BY    Dept
```

NOTE: CURRENT gives the system date
YEAR is a built in function: returns a four digit integer that represent the year

Types of User views

Derive

```
CREATE VIEW Item_Price AS
SELECT  *, Dol_Price*90 AS Rs_Price
FROM    Items
```

Types of User views

Joined

```
CREATE VIEW Emp_Payroll AS
SELECT  Emp_No, Emp_Name, Designation,
        Dept_Name
FROM    Employee E, Department D
WHERE   E.Dept = D.Dept_Code
```

Why User views?

Benefits

4 Security

Protect data from unauthorized access. Each user is given permission to access the database via only a small set of views that contain specific data the user is authorized to see.

User views

Benefits

4 Query Simplicity

Turning multiple table queries to single table queries against views, by drawing data from several tables. It provides flexible and powerful data access capabilities.

User views

Benefits

4 Query Simplicity contd.

It also improves productivity of end-user and programmers by:

- **Simplifying database access by presenting the structure of data that is most natural to the user.**
- **Simplifying the use of routine and repetitive statements**
- **Building up SELECT statements in several steps.**

User views

Benefits

4 Natural Interface

“Personalized” view of database structure, that make sense for the user. Restructure or tailor the way in which tables are seen, so that different users see it from different perspectives, thus allowing more natural views of the same enterprise (e.g. item names)

User views

Benefit

4 Insulation from change

Data independence - maintain independence among different user views and between each user view and the physical constructs

A view can present a consistent image of the database structure, even if the underlying source tables are restructured.

User views

Benefit

4 Data Integrity

DBMS can check data to ensure that it meets specified integrity constraints.

User view Design Considerations

- User view design is driven by specific application requirements
- User may be defined for individual user, or a group of users, of the transaction or application

Design Considerations

- User view may be defined to control and restrict access to specific columns and/or rows in one or more tables
- User views can be defined to help simplify queries, application development and maintenance
- User views may be derived from base tables or other user views

Limitations of User views

Restrictions on views processing

SELECT, INSERT, UPDATE and DELETE statements may refer to views, but there are a number of limitations. Update may be possible for ‘simple’ views but not ‘complex’ views.

Limitations

Performance

DBMS must translate queries against the view to queries against the source tables.

These disadvantages means that we cannot indiscriminately define and use views instead of source tables.

Remove a User View

Drop a View

DROP VIEW *view-name*

E.g.

DROP VIEW Emp_Payroll

Removes only the definition of the view table.
Data it used to retrieve is not effected.